Sales Chasing in LaPorte County for Pay 2007 Assessments

Sales chasing, more formally known as the selective reappraisal of sold properties stimulated by the sale of the property, results in recently sold properties not being appraised commensurately with those that have not been recently sold. In addition to generating inequitable differences between recently sold properties and those not recently sold, sales chasing also invalidates the best tool available for judging the quality of assessment performance, namely the assessment sales ratio study, because the assessments in the ratio study are not representative of the assessments in the jurisdiction being analyzed. Thus it is prudent to test assessments and ratio studies to see whether there is evidence of sales chasing. The results of the 2006 pay 2007 reassessment of LaPorte County were analyzed for this purpose, and the results are reported below. In general it is clear that there is some degree of sales chasing present in the county, although not all townships engage in the practice. It affects the county on an overall basis and is clearly evident in roughly half of the townships, including the two largest ones, and so indirectly affects the equity of the entire county.

A standard test for sales chasing involves the comparison of two sets of percentage changes in assessed values, from the year before the reassessment to the year after it: (1) those for properties that were sold and used in the ratio study and (2) those that were not sold. In order to avoid contaminating the comparison with confounding assessment changes, such as those resulting from new construction, all properties affected by new construction or new parcel creations (e.g. parcel splits) were excluded from the comparison, as were all properties that had a change in their property class between the two years or between the sale date and the assessment date. Table 1 presents the results of such an analysis. Presented there are summaries of the percentage changes in assessed value (before exemptions, etc.) for sold and unsold properties for the Pay 2007 reassessment, along with a summary of the difference between them. Three summary measures are presented: the simple mean (or average) percentage change, the five-percent-trimmed mean (which is often used to avoid distortions caused by extreme values), and the median (which can also be thought of as the fifty-percent-trimmed mean). In addition to the summary measures, the table reports p-values from a Mann-Whitney test to determine whether the two sets of percentage changes are likely to have arisen by chance alone from a single underlying population, in which case the p-value will be high, or, in contrast, whether the different percentage changes indicate differences between the two sets not likely to have arisen by sampling variation alone. The test takes into account the sizes of the samples and their variability, skewness, and centrality. Mann-Whitney test p-values near zero suggest that the observed differences between the two sets of data are unlikely to have arisen only by chance.

In the IFPI study the issue of sales chasing was addressed in an assembly line fashion given the constraints imposed by time and the available data sets. For that study two criteria were required for a jurisdiction to be thought likely to have engaged in sales chasing: the p-value from the Mann-Whitney test had to be less than 0.05 and the median percentage change for sold properties had to exceed the median percentage change for the unsold properties by five percent. It probably understated the

reality. The IAAO standard on ratio studies does not establish specific statistics or thresholds in this regard.

Sales chasing does not have to encompass all sold parcels to be pernicious, especially if a small but significant portion of the parcels in the jurisdiction is affected by bad data on property characteristics. In such a case, which may well obtain here, there are two interests to balance: preventing a few aberrant values from dominating a summary statistic like the mean and using statistics sensitive enough to be able to detect problems that may affect a tenth or a quarter of the parcels in a jurisdiction, but not necessarily half of them. In contrast to the mean, which can be affected by a single extraordinary value, the median is insensitive to all values except for the one (or two) in the middle. Thus neither is an ideal measure of potentially subtle differences between two data sets. For this purpose the five-percent-trimmed mean is probably best, although Table 1 presents all three statistics for readers who want to consider the more familiar alternatives. For similar reasons, some controversy may surround the issue of whether to base the analysis on all qualified data, as is done in the top third of Table 1, or instead to trim extremes or even all outliers from the data before running the analysis, as is done in the lower panels of the table. All three alternatives are presented, in order to help establish the sensitivity of the test, but conceptually, given the screening of the data to remove the effects of new construction, splits, changes in use, and the like, the first is optimal, although the analysis with the elimination of extremes may be appropriate if one thinks other causes of anomalies may have been overlooked. The elimination of outliers, in addition to being conceptually unsound, serves to wash out important differences affecting a limited portion of the data sets. At the overall-county level, disparate treatment of sold and unsold property ("sales chasing") is indicated at a confidence level well in excess of 99 percent in all three panels of Table 1, i.e. whether all the data are analyzed in their entirety or the data are trimmed of extremes or outliers. For the top two panels of Table 1, any statistically significant finding is also practically significant in the sense that the difference between the five-percent-trimmed means of the sold and unsold properties is at least five percent, analogous to the requirement in the IFPI study.

Table 2 explores the mechanism by which the subtle form of sales chasing is usually put into effect, namely by assessors changing subjective descriptors of properties that sold but were not well appraised. Six subjective variables were available in the standard data sets provided annually by the county to DLGF in the so called Improvement file: grade, condition, effective year built, a neighborhood quality code, physical depreciation, and obsolescence depreciation. These were analyzed as a set to see whether there was a greater tendency for assessors to change them for sold properties than for unsold properties. Doing so would afford assessors a convenient means of bringing the sold properties' assessments into line with their sale prices, although the practice would amount to illegitimate sales chasing if similar unsold properties were not treated similarly. As is indicted in Table 2, well over half of the townships, and the county as a whole, show a differential tendency to update subjective variables as between sold and unsold properties when the usual precautions are taken to exclude new construction and new parcels from the analysis. For the county as a whole, sold properties are 62 percent more likely to have experienced changes to such recorded characteristics if they were sold than if they were unsold, and in some townships the increased probability exceeded 800 percent, as shown in the table. The

table also gives a hint of the incidence of the sales chasing problem. Countywide, about 34 percent of the sold properties had adjustments made to the records of their subjective characteristics, while only about 21 percent of the unsold properties were so treated. As a first approximation, then, we may estimate that perhaps 10-20 percent of the parcels in the jurisdiction have defective descriptive characteristics that were addressed by making changes to recorded characteristics to bring their appraised values into line with the values suggested by their sales prices.

If the 10-20 percent estimate of the incidence of defective data on property characteristics is accurate, it would easily explain why the results of the county's ratio study differ so dramatically from the results obtained when sales from 2006 were considered. The county's final ratio study used only sales from 2004-2005, which these analyses suggest were highly likely to have been affected by sales chasing. When subsequent sales were used as the standard, the previous results showing compliance with standards changed radically. Not only did the performance results reported in the memo of October 19, 2007 differ from the county's final report, but the county's memo of November 28 notes that its own internal study generated similarly negative results when sales from 2006 were used.

In summary, it seems highly likely that assessments in LaPorte County are affected by sales chasing and that the practice of sales chasing may well explain the contrast between the assessment performance measures indicated by the county's final ratio study and the results reported in the memo of October 19, 2007.

Table 1
Comparison of Percentage Changes In Assessed Values, Pay 2006 to Pay 2007,
Between Properties in the LaPorte County Final 2006 Ratio Study (11/30/2007)
And Properties Not Sold Since 1/1/2004, Excluding New Construction and New Parcels

			Summary Percentage Changes Unsold Parcels			Summary Percentage Changes Sold Parcels			Difference of Summary Changes: Sold - Unsold		
		P-value from Mann-Whitney test	Mean	5% Trimmed Mean	Median	Mean	5% Trimmed Mean	Median	Mean	5% Trimmed Mean	Median
No Trimming											
County	OVERALL	0.000 **	22.40	17.41	12.66	32.88	26.34	17.10	10.48	8.93	4.44
1	Cass Twp	0.047 *	7.59	5.07	3.68	16.64	16.30	7.13	9.05	11.23	3.45
2	Center Twp	0.000 **	9.03	8.36	7.20	17.69	15.21	8.51	8.66	6.85	1.31
3	Clinton Twp	0.885	22.03	17.74	17.77	31.37	27.30	21.26	9.34	9.56	3.49
4	Coolspring Twp	0.000 **	19.59	16.78	14.08	43.47	36.82	26.47	23.88	20.04	12.39
5	Dewey Twp	0.265	19.01	14.90	9.76	17.17	13.65	-0.40	-1.84	-1.25	-10.16
6	Galena Twp	0.000 **	30.87	25.65	20.49	72.09	66.66	48.72	41.22	41.01	28.23
7	Hanna Twp	0.000 **	34.53	29.49	25.99	73.50	74.54	76.75	38.97	45.05	50.76
8	Hudson Twp	0.965	18.07	14.61	12.13	23.80	21.75	13.10	5.73	7.14	0.97
9	Johnson Twp	0.023 *	8.83	8.30	7.35	NA	NA	NA			
10	Kankakee Twp	0.001 **	10.91	7.72	4.99	20.65	17.11	12.23	9.74	9.39	7.24
11	Lincoln Twp	0.260	23.58	18.65	13.06	50.08	42.65	28.76	26.50	24.00	15.70
12	Michigan Twp	0.000 **	35.20	30.98	20.92	44.32	38.96	27.49	9.12	7.98	6.57
13	New Durham Twp	0.067	20.94	16.60	14.70	23.55	21.23	17.09	2.61	4.63	2.39
14	Noble Twp	0.081	30.77	27.54	23.11	41.30	41.61	32.07	10.53	14.07	8.96
15	Pleasant Twp	0.500	17.36	15.55	15.51	18.61	16.69	13.86	1.25	1.14	-1.65
16	Prairie Twp	0.244	16.80	14.91	13.62	NA	NA	NA			
17	Scipio Twp	0.000 **	10.35	9.40	8.14	16.59	16.45	16.16	6.24	7.05	8.02
18	Springfield Twp	0.000 **	35.67	26.08	15.34	80.95	65.93	40.80	45.28	39.85	25.46
19	Union Twp	0.100	15.40	12.24	9.84	37.66	16.04	15.15	22.26	3.80	5.31
20	Washington Twp	0.002 **	12.82	10.77	8.99	71.00	67.96	40.50	58.18	57.19	31.51
21	Wills Twp	0.489	11.47	9.00	7.85	9.80	9.90	10.32	-1.67	0.90	2.47
Extremes Trimmed											
County	OVERALL	0.000 **	15.76	14.44	11.80	20.58	19.73	14.54	4.82	5.29	2.74
1	Cass Twp	0.035 *	5.16	4.88	3.63	16.64	16.30	7.13	11.48	11.42	3.50
2	Center Twp	0.000 **	8.72	8.29	7.17	15.53	14.34	8.24	6.81	6.05	1.07
3	Clinton Twp	0.708	17.92	16.61	16.93	20.29	19.25	12.56	2.37	2.64	-4.37
4	Coolspring Twp	0.005 **	16.94	16.26	13.86	23.86	23.61	22.39	6.92	7.35	8.53
5	Dewey Twp	0.200	13.35	12.69	9.07	11.25	9.73	-2.39	-2.10	-2.96	-11.46
6	Galena Twp	0.095	23.89	22.62	19.76	33.99	32.91	25.74	10.10	10.29	5.98
7	Hanna Twp	0.002 **	27.98	27.45	25.37	50.92	54.38	69.87	22.94	26.93	44.50
8	Hudson Twp	0.650	15.19	13.67	11.94	16.06	15.52	12.60	0.87	1.85	0.66
9	Johnson Twp	NA	8.83	8.30	7.35	NA	NA	NA			
10	Kankakee Twp	0.000 **	8.68	7.09	4.89	17.47	15.77	11.83	8.79	8.68	6.94
11	Lincoln Twp	0.317	17.38	16.02	11.86	14.36	12.99	6.08	-3.02	-3.03	-5.78
12	Michigan Twp	0.000 **	22.87	21.80	16.98	27.61	27.34	21.97	4.74	5.54	4.99
13	New Durham Twp	0.052	16.51	15.60	14.44	21.32	19.46	16.96	4.81	3.86	2.52
14	Noble Twp	0.207	27.02	26.17	22.46	34.58	34.49	29.58	7.56	8.32	7.12
15	Pleasant Twp	0.483	15.47	15.19	15.47	16.70	16.04	13.59	1.23	0.85	-1.88
16	Prairie Twp	0.222	15.45	14.58	13.40	NA	NA	NA			
17	Scipio Twp	0.000 **	9.89	9.36	8.00	16.59	16.45	16.16	6.70	7.09	8.16
18	Springfield Twp	0.000 **	16.93	15.32	13.68	29.00	28.98	29.63	12.07	13.66	15.95
19	Union Twp	0.566	13.09	11.69	9.66	19.14	19.67	13.14	6.05	7.98	3.48
20	Washington Twp	0.090	10.74	10.41	8.91	23.14	22.94	19.43	12.40	12.53	10.52
21	Wills Twp	0.436	9.81	8.67	7.77	9.80	9.90	10.32	-0.01	1.23	2.55
Outliers Trimmed											
County	OVERALL	0.002 **	13.52	12.91	11.11	15.40	15.12	11.92	1.88	2.21	0.81
1	Cass Twp	0.028 *	5.33	4.85	3.65	16.44	15.34	7.13	11.11	10.49	3.48
2	Center Twp	0.000 **	8.72	8.27	7.21	13.44	12.82	8.02	4.72	4.55	0.81
3	Clinton Twp	0.185	15.84	15.37	16.46	11.93	11.61	8.99	-3.91	-3.76	-7.47
4	Coolspring Twp	0.799	16.17	15.92	13.52	16.92	16.73	17.93	0.75	0.81	4.41
5	Dewey Twp	0.012 *	12.08	11.72	8.82	0.61	-0.80	-10.73	-11.47	-12.52	-19.55
6	Galena Twp	0.228	21.07	20.73	18.94	25.17	24.96	21.39	4.10	4.23	2.45
7	Hanna Twp	0.113	26.58	26.57	24.95	37.43	NA	37.43	10.85		12.48
8	Hudson Twp	0.416	13.52	12.59	11.64	9.57	9.22	12.12	-3.95	-3.37	0.48
9	Johnson Twp	NA	8.68	8.22	7.35	NA	NA	NA			
10	Kankakee Twp	0.005 **	7.62	6.64	4.79	12.38	12.16	10.68	4.76	5.52	5.89
11	Lincoln Twp	0.326	13.63	13.08	11.04	11.01	10.78	5.77	-2.62	-2.30	-5.27
12	Michigan Twp	0.039 *	17.02	16.55	14.78	18.35	18.39	17.21	1.33	1.84	2.43
13	New Durham Twp	0.188	15.63	15.20	14.35	16.28	16.54	16.38	0.65	1.34	2.03
14	Noble Twp	0.797	24.62	24.38	21.41	22.86	23.96	21.94	-1.76	-0.42	0.53
15	Pleasant Twp	0.281	14.94	15.05	15.40	15.06	14.67	13.22	0.12	-0.38	-2.18
16	Prairie Twp	0.222	15.45	14.58	13.40	NA	NA	NA			
17	Scipio Twp	0.000 **	9.66	9.30	7.92	16.59	16.45	16.16	6.93	7.15	8.24
18	Springfield Twp	0.000 **	14.62	14.01	12.95	25.48	25.98	27.00	10.86	11.97	14.05
19	Union Twp	0.435	12.07	11.23	9.55	10.37	9.50	9.30	-1.70	-1.73	-0.25
20	Washington Twp	0.086	10.91	10.37	8.94	23.14	22.94	19.43	12.23	12.57	10.49
21	Wills Twp	0.412	9.36	8.55	7.74	9.80	9.90	10.32	0.44	1.35	2.58

Notes: * Significant at 95% confidence level
** Significant at 99% confidence level, or higher

Table 2

Changes to Subjective Variables Between Pay 2006 and Pay 2007 for Existing Improved Parcels
By Whether or Not the Property Sold Since 1/1/2004
And the Likelihood that Different Propensities To Change Arose By Chance Alone

		Chi-Square p-value: likelihood of same treatment	Pct of Existing Unsold Parcels with Changes	Pct of Existing Sold Parcels with Changes	Increased Likelihood of Change If Sold
County	OVERALL	0.000 **	21.2	34.3	62%
1	Cass Twp	0.159	8.3	12.3	48%
2	Center Twp	0.000 **	14.4	29.3	103%
3	Clinton Twp	0.000 **	13.4	34.2	155%
4	Coolspring Twp	0.000 **	7.8	26.0	233%
5	Dewey Twp	0.018 *	45.7	59.3	30%
6	Galena Twp	0.000 **	1.9	13.8	626%
7	Hanna Twp	0.000 **	3.1	17.6	468%
8	Hudson Twp	0.000 **	4.3	17.4	305%
9	Johnson Twp	0.119	4.2	14.3	240%
10	Kankakee Twp	0.010 *	28.6	36.8	29%
11	Lincoln Twp	0.030 *	61.0	59.6	-2%
12	Michigan Twp	0.000 **	45.6	55.9	23%
13	New Durham Twp	0.103	5.1	7.9	55%
14	Noble Twp	0.000 **	2.7	11.0	307%
15	Pleasant Twp	0.000 **	5.4	15.8	193%
16	Prairie Twp	0.060	1.1	10.0	809%
17	Scipio Twp	0.000 **	2.9	16.1	455%
18	Springfield Twp	0.000 **	4.0	16.4	310%
19	Union Twp	0.000 **	1.9	12.0	532%
20	Washington Twp	0.055	9.3	16.5	77%
21	Wills Twp	0.000 **	1.3	12.2	838%

Note: * Significant at 95% confidence level

** Significant at 99% confidence level, or higher

The subjective variables included in the test were:

a. Grade
b. Condition
c. Effective Age
d. Neighborhood Quality Code
e. Physical Depreciation
f. Obsolescence Depreciation